

Appl. No. 10/801,828  
Amdt. Dated May 30, 2006  
Reply to Office Action of February 28, 2006

### **REMARKS**

#### ***Introduction***

In response to the Office action, applicant has amended the Specification. In paragraph [0018], it is now stated that “[t]he display device can be a liquid crystal display device, in which case the substrate 1 of the TFT 200 is transparent.” In claim 12 of the Specification as originally filed, the claimed device is a display device used to control and drive display material that is liquid crystal. Accordingly, applicant submits that claim 12 would be understood by a person of ordinary skill in the art to be claiming a liquid crystal display device. In paragraph [0017] of the Specification as originally filed, it is stated that the substrate 1 can be made from glass or silicon oxide. Glass is notoriously known as being ordinarily transparent. In addition, applicant submits that a substrate made from silicon oxide would be understood by a person of ordinary skill in the art to typically be transparent, and that a substrate made from silicon oxide and employed in a liquid crystal display device would be understood by a person of ordinary skill in the art to be transparent. Accordingly, applicant asserts that the substrate 1 of the thin film transistor 200 employed in the liquid crystal display device of FIG. 2 would be understood by a person of ordinary skill in the art to be transparent. Therefore it is submitted that no new matter is entered.

In addition, applicant has canceled previously added description regarding “a transparent substrate” from paragraph [0017], and has canceled the previously added portion regarding “[i]n addition, ... a higher aperture ratio” from paragraph [0020].

Further, applicant has amended claims 1-2, 4-11, 21-22, 24 and 26,

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and has canceled claims 12, 23, 25 and 27 without prejudice.

***Claim Rejections under 35 U.S.C. 112***

Claims 1-2, 4-12 and 21-27 are rejected under U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

It is stated that "the limitation of 'transparent substrate, as recited in claims 1, 11 and 21, is not supported in the original disclosure."

In response to the rejection, applicant has amended claims 1, 11 and 21, and has canceled claims 12, 23, 25 and 27. Applicant asserts that the amended claims are now supported in the original disclosure.

Amended claim 1 now claims "[a] single-gated thin film transistor used in a liquid crystal display device, comprising: a transparent homogeneous base substrate... etc." Applicant refers to and relies on the above assertions regarding amended paragraph [0018], wherein it is now described that "[t]he display device can be a liquid crystal display device, in which case the substrate 1 of the TFT 200 is transparent." As detailed and asserted above, a person of ordinary skill in the art would understand that the substrate 1 of the thin film transistor 200 employed in the liquid crystal display device of FIG. 2 would be transparent. Accordingly, it is submitted that the limitations of amended claim 1 are supported in the original disclosure. Reconsideration and withdrawal of

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the rejection of amended claim 1 are respectfully requested.

Amended claim 11 now claims "[a] liquid crystal display device..., wherein each of the thin film transistors comprises: a transparent base substrate... etc." For reasons similar to those asserted above in relation to amended claim 1, it is submitted that the limitations of amended claim 11 are supported in the original disclosure. Reconsideration and withdrawal of the rejection of amended claim 11 are respectfully requested.

Amended claim 21 now claims "[a] thin film transistor ..., comprising: a homogeneous base substrate... etc." That is, the limitation of "transparent" regarding the claimed substrate has been canceled. Accordingly, it is submitted that the limitations of amended claim 21 are supported in the original disclosure. Reconsideration and withdrawal of the rejection of amended claim 21 are respectfully requested.

Accordingly, reconsideration and withdrawal of the rejection of the corresponding amended dependent claims 2, 4-11, 22, 24 and 26 are also respectfully requested.

### ***Specification***

The amendment filed 01/18/2006 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure.

It is stated that "[t]he added material which is not supported by the original disclosure is as follows: in paragraph [0017], the added limitation

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of 'a transparent substrate' and in paragraph [0020], the new added portion 'in addition, ... a higher aperture ratio' is not supported in the original disclosure."

In response to the objection, applicant has canceled the added limitation regarding "a transparent substrate" from paragraph [0017] and the newly added portion regarding "[i]n addition, ... a higher aperture ratio" from paragraph [0020].

### ***Claim Rejections under 35 U.S.C. 103***

Claims 1-2, 4-5, 6-12 and 21-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (U.S. Pat. 6,452,210) in view of Tanaka et al. (U.S. Pub. 2004/0027503).

It is stated that "Lee (FIG. 3) discloses a thin film transistor used in a display device, comprising: a substrate 30; a gate electrode 32 made of metallic material such as Al, Mo, Cr, Ta and an Al alloy (column 3, lines 31-33), the gate electrode 32 being disposed in the substrate 30; a silicon nitride or silicon oxide [of] gate insulation layer 34 (column 3, lines 35-37) disposed on the substrate 30 and gate electrode 32; a channel layer 36 disposed on the gate insulation layer 34; a source/drain ohmic contact layer 38 arranged on opposite ends of the channel layer; a source electrode 40 disposed on the substrate 30 and source ohmic contact layer 38, and a drain electrode 40 disposed on the substrate 30 and drain ohmic contact layer 38."

In response to the rejection, applicant has amended independent claims 1, 11 and 21, and has canceled claim 12, 23, 25 and 27. Applicant asserts that the amended claims are now patentable, as follows:

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Amended claim 1 recites in pertinent part "[a] single-gated thin film transistor used in a liquid crystal display device, comprising: a transparent homogeneous base substrate; a gate electrode being made of metallic material, and the gate electrode disposed in the transparent homogeneous base substrate." That is, in amended claim 1, the sole transparent homogeneous base substrate is provided, and then the gate electrode can be formed.

Firstly, the thin film transistor disclosed by Lee consists of a gate electrode 32, a gate insulating film 34, a semiconductor layer 36, an ohmic contact layer 38, and source and drain electrodes 40 and 42, which are formed on the smoothing layer 30. The gate electrode 32 is provided at the recess 30A of the smoothing layer 30. In the present invention, the single transparent homogeneous base substrate serves as the sole bottom supporting material upon which integrated circuitry structure is fabricated, or to which integrated circuitry structure is attached. Therefore, the smoothing layer 30 cannot be characterized as a base substrate of the thin film transistor.

Secondly, in Lee, the smoothing layer 30 is formed on color filters 28, which in turn are formed on a transparent substrate 24. That is, in the thin film transistor disclosed by Lee, the transparent substrate 24 supports the smoothing layer 30, in order that the gate electrode 32 can be provided on the smoothing layer 30. Therefore, the smoothing layer 30 cannot be characterized as a homogeneous base substrate of the thin film transistor.

Thirdly, in Lee, the very fact that the smoothing layer 30 is separately

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distinguished from the transparent substrate 24 is indicative that the smoothing layer 30 is not considered as being a "substrate" in the overall configuration of the thin film transistor. Therefore, the smoothing layer 30 cannot be characterized as a base substrate of the thin film transistor.

These differences indicate that Lee does not teach a single-gated thin film transistor comprising all the limitations recited in amended claim 1.

Further, Tanaka does not disclose a single-gated thin film transistor including a gate electrode disposed in a transparent homogeneous base substrate.

Therefore, there is no motivation or suggestion in either Lee or Tanaka that the reference be combined with the other in such a way as to provide a thin film transistor comprising all the limitations recited in amended claim 1.

Moreover, in the present invention, the gate electrode made of metallic material is deposited in the transparent homogeneous base substrate, and thus the thickness of the gate electrode can be changed by changing the depth of the transparent homogeneous base substrate etched. As a result, it is relatively easy to increase the thickness of the gate electrode to reduce its impedance, so that the single-gated thin film transistor of amended claim 1 can efficiently reduce an RC (resistance-capacitance) delay of a scanning signal. In contrast, in Lee, the smoothing layer 30 is coated on the color filter 28 so as to prevent contamination in the color filters 28 and compensate for a step coverage or morphological difference between the red, green and blue color filters

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28 formed separately.

Furthermore, in amended claim 1, only the sole homogeneous base substrate is needed for forming the gate electrode. Therefore, the single-gated thin film transistor of amended claim 1 is simplified, and a thickness of the single-gated thin film transistor of amended claim 1 has been reduced. That is, the single-gated thin film transistor of amended claim 1 produces new and unexpected results.

Accordingly, amended claim 1 is submitted to be unobvious and patentable over Lee in view of Tanaka under 35 U.S.C. 103(a). Reconsideration and withdrawal of the rejection of amended claim 1 are respectfully requested.

Claims 2, 4-10 and 22 depend directly and indirectly from independent amended claim 1, and therefore should also be allowable.

For reasons similar to those asserted above in relation to amended claim 1, it is submitted that Lee combined with Tanaka does not disclose, teach or suggest all the limitations of the single-gated thin film transistor of the liquid crystal display device claimed in amended claim 11.

Accordingly, amended claim 11 is submitted to be unobvious and patentable over Lee in view of Tanaka under 35 U.S.C. 103(a). Reconsideration and withdrawal of the rejection and allowance of amended claim 11 are respectfully requested.

Claim 24 depends directly from independent amended claim 11, and therefore should also be allowable.

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For reasons similar to those asserted above in relation to amended claim 1, it is submitted that Lee combined with Tanaka does not disclose, teach or suggest the single-gated thin film transistor as recited in amended claim 21.

Furthermore, in claim 21, the gate electrode made of metallic material is deposited in the homogeneous base substrate, and thus the thickness of the gate electrode can be changed by changing the depth of the transparent homogeneous base substrate etched. As a result, it is relatively easy to increase the thickness of the gate electrode to reduce its impedance, so that the single-gated thin film transistor of amended claim 21 can efficiently reduce an RC (resistance-capacitance) delay of a scanning signal. In contrast, in Lee, the smoothing layer 30 is coated on the color filter 28 so as to prevent contamination in the color filters 28 and compensate for a step coverage or morphological difference between the red, green and blue color filters 28 formed separately.

Moreover, in amended claim 21, only the sole homogeneous base substrate is needed for forming the gate electrode. Therefore, the single-gated thin film transistor of amended claim 21 is simplified, and the thickness of the single-gated thin film transistor is reduced. That is, the single-gated thin film transistor of amended claim 21 produces new and unexpected results.

Accordingly, amended claim 21 is submitted to be unobvious and patentable over Lee in view of Tanaka under 35 U.S.C. 103(a). Reconsideration and withdrawal of the rejection and allowance of amended claim 21 are respectfully requested.



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Claim 26 depends directly from independent amended claim 21, and therefore should also be allowable.

New claim 28 depends directly from independent amended claim 11, and therefore should also be allowable.

In view of the foregoing, the present application as claimed in the pending claims is considered to be in a condition for allowance, and an action to such effect is earnestly solicited.

Respectfully submitted,  
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